



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/379,702	08/24/1999	HISASHI OHTANI	07977/093002	1613

20985 7590 02/14/2002

FISH & RICHARDSON, PC
4350 LA JOLLA VILLAGE DRIVE
SUITE 500
SAN DIEGO, CA 92122

EXAMINER

LEE, EUGENE

ART UNIT PAPER NUMBER

2815

DATE MAILED: 02/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/379,702

Applicant(s)

OHTANI ET AL.

Examiner

Eugene Lee

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-12, 14-25, 27, 28 and 30-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-12, 14-25, 27, 28 and 30-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08757112.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 3, 5 thru 12, 14 thru 23, 35 thru 44 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamazaki et al. '621 B1. Yamazaki discloses (see, for example, FIG. 3D) a semiconductor device comprising an island silicon region (crystalline semiconductor layer) 32, impurity regions (source region and drain region) 36A/36B, channel, silicon oxide film (gate insulating layer) 33, and gate electrode 34. In column 6, lines 8-11, Yamazaki discloses the silicon oxide film having a thickness of 500 to 1500 angstroms. By using a laser (which also produces ridges), one can produce a silicon film of good crystallinity. See, for example, column 6, lines 47-*.

Regarding the claims (i.e. claim 5) mentioning the size of the ridges as less than 500 Å, since Yamazaki discloses (see, for example, column 6, line 1) the thickness of the silicon film as

being 200-3000 Å, the possible size of the ridges formed on such a film must necessarily be much smaller than the above stated size.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, and 31 thru 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. '030 in view of Noguchi et al. '951. Yamazaki discloses (see, for example, FIG 11 (D)) a semiconductor device comprising a silicon film (semiconductor island), source 160, drain 161, channel, silicon oxide film 153, and silicon nitride film 154. In column 15, line 34, Yamazaki states the thickness of the silicon nitride film as being 50 to 200 Å. Yamazaki does not disclose a ridge on the surface of said semiconductor island. However, Noguchi teaches (see, for example, abstract and column 3, lines 34-46) that exposing a silicon thin film to laser pulses will improve its crystallinity. Such pulses will form ridges on the film. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use laser pulses (and form ridges) on the silicon film of Yamazaki in order to crystallize the film and improve its electron mobility.

5. Claims 24, 25, 27, 28, and 30 thru 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsu '151. Tsutsu discloses (see, for example, FIG. 2B) a semiconductor device comprising a silicon film wherein the silicon film comprises a source 6a, channel 2a, and

Art Unit: 2815

drain 7a, and a silicon nitride gate insulating film 11. Laser irradiation crystallizes the silicon film. See, for example, column 8, lines 34-39. Tsutsu does not disclose the silicon nitride gate insulating film as being from 250 to 500 Å or 350 to 600Å. However, it would have been obvious to one of ordinary skill in the art at the time of invention to use such ranges, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art and using such ranges would provide a film of minimum thickness and produce an overall less bulky semiconductor device.

In re Aller, 105 USPQ 233.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsu '151 as applied to claims 24, 25, 27, 28, and 30 thru 34 above, and further in view of Yamazaki '998. Tsutsu does not disclose one lightly doped region between said channel formation region and at least one of said source region and said drain region. However, Yamazaki discloses (see, for example, FIG. 1D and column 1, lines 48-57) a semiconductor device comprising a lightly doped region (LDD) between the channel and drain. Furthermore, Yamazaki teaches that the LDD will decrease the electric field of a semiconductor device. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to include the lightly doped region in Tsutsu's invention in order to decrease the electric field and, therefore, make the semiconductor device more stable.

Response to Arguments

7. Applicant's arguments with respect to claims 2-12, 14-25, 27, 28, and 30-44 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2815


INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 703-305-5695. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 703-308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Eugene Lee
February 9, 2002



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2002